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(54) Cast plastics contact lens mould

(57) The mould comprises cast plastics mould parts (4) and (5) defining a moulding cavity (8) and a reservoir (11) from which polymerisable material can be drawn into the moulding cavity to compensate for shrinkage. The top of the reservoir 11 is sealed at annular mould flanges (14, 15), to avoid loss of volatile solvent from the polymerisable material and hence maintain the composition of the material, either by complementary abutments (12, 13) which engage at inclined surfaces (16), or by an abutment engaging the other flange at a knife edge. The mould part (4) is deflected by a spring, along a patch (17), into contact with mould part (5) around the periphery of the cavity (8).

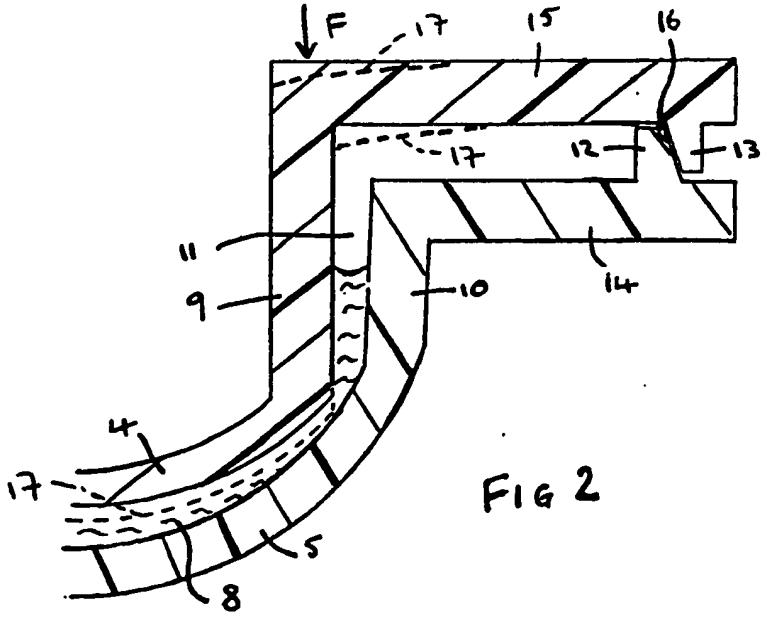

FIG 2

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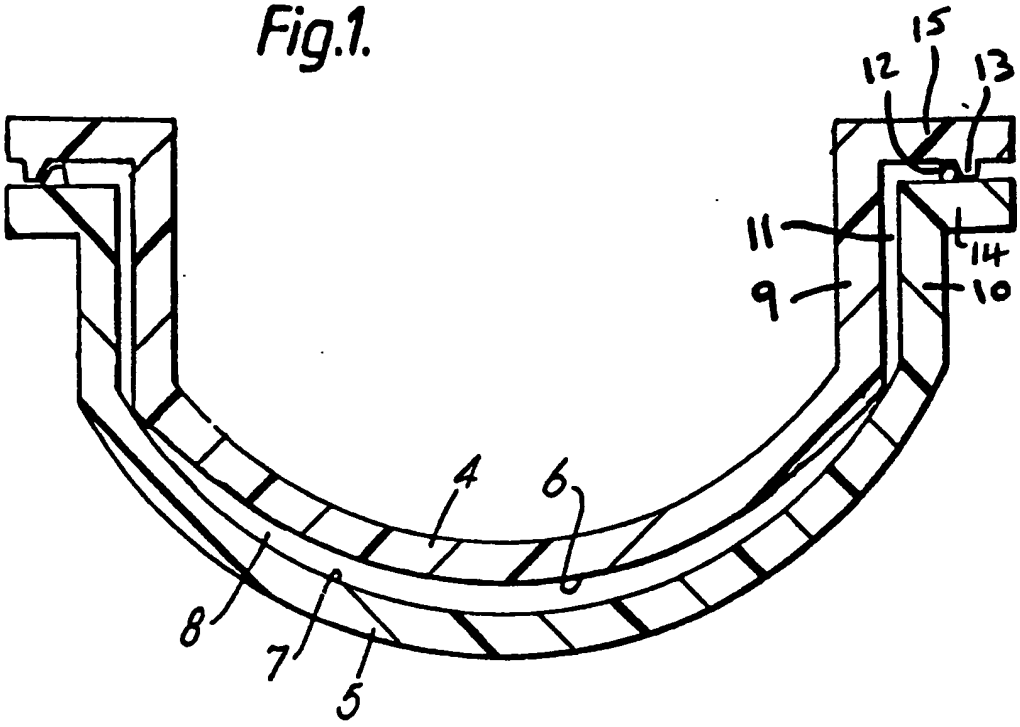
Fig.1.



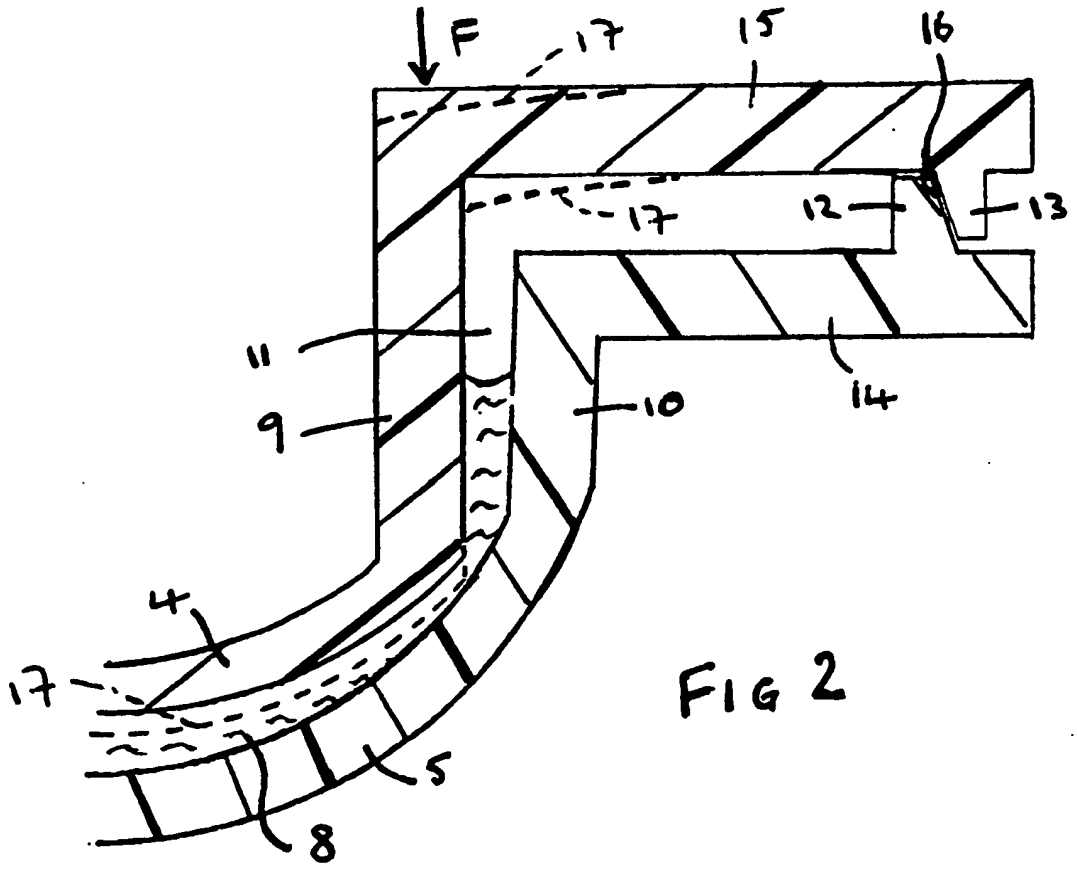


FIG 2

DESCRIPTION

LENS MOULD

A technique, which has recently become popular for the manufacture of ophthalmic correction contact lenses from plastics material, is known as cast moulding. In this technique, two plastics mould parts with convex and concave moulding surfaces are cast from master dies and are subsequently juxtaposed to provide a moulding cavity between the convex and concave moulding surfaces. A polymerisable liquid is polymerised within the moulding cavity to form a contact lens, whereafter the mould parts are separated to release the lens and are disposed of.

When the mould parts are juxtaposed, they substantially abut one another at the peripheral edge of the moulding cavity but, outside the moulding cavity, are spaced from one another to provide an annular reservoir. In use, polymerisable liquid is placed in the concave moulding surface, and the mould parts are juxtaposed so that an amount of the polymerisable liquid is trapped within the moulding cavity, the balance of the liquid being displaced into the annular reservoir. When the assembly is subsequently heated to cause polymerisation of the liquid in the moulding cavity, some shrinkage of the liquid occurs and, in spite of the abutment between the mould parts, some of the liquid is drawn from the annular reservoir into the moulding cavity so that the cavity remains filled, and the resulting moulded lens conforms fully to the profile of the moulding cavity.

However, a problem arises because the polymerisable liquid incorporates a readily volatile constituent and there is a danger that the liquid drawn from the reservoir into the moulding cavity

will not have the same composition as the polymerisable liquid in the moulding cavity, owing to volatilisation.

In accordance with the present invention, a pair of cast plastics mould parts for use in the moulding of ophthalmic contact lenses comprises a first part with a convex moulding surface and a second part with a concave moulding surface, the mould parts being arranged to be juxtaposed so that the two moulding surfaces define therebetween a moulding cavity for moulding a plastics contact lens, and, surrounding the moulding cavity, an annular reservoir from which, during shrinkage of a polymerisable liquid in the moulding cavity, a further amount of the liquid can be drawn from the reservoir into the cavity, the reservoir being substantially sealed by an annular seal which, in use, inhibits escape of any volatile constituent from the polymerisable liquid in the reservoir.

This arrangement ensures that any volatile constituent of the polymerisable liquid within the annular reservoir is prevented from escaping upon evaporation, so that any of the polymerisable liquid which is drawn from the annular reservoir into the moulding cavity is substantially of the same composition as that already in the cavity.

Preferably, each of the mould parts has a radially outwardly extending annular flange at the end of the reservoir remote from the moulding cavity, the annular seal being provided by a rib formed integrally with one of the flanges abutting an integral part of the other flange. The integral part of the other flange may then be a second rib, the two ribs having complementary abutting surfaces which are inclined to the mould axis. The mould parts may be arranged to be urged together, one of the flanges being flexible to allow the convex and concave

moulding surfaces to abut one another to define the periphery of the moulding cavity after the annular seal abutment has occurred.

The invention is illustrated by way of example with respect to the accompanying drawings, in which:-

Figure 1 is a diammetrical section through a pair of mould parts; and,

Figure 2 is an enlargement of the right hand portion of Figure 1.

As shown in the drawings, first and second mould parts 4, 5 have convex and concave moulding surfaces 6, 7, which define therebetween a moulding cavity 8, delimited at its periphery by abutment between the mould parts 4 and 5. Outside the mould cavity, cylindrical portions 9, 10 of the mould parts 4, 5 define therebetween an annular reservoir 11. The reservoir is sealed by the engagement of complementary annular ribs 12, 13 formed integrally with annular flanges 14 and 15 of the parts 5, 4. The seal may be formed by engaging inclined annular surfaces 16 of the ribs. However, a similar result can be achieved if the rib 13 is eliminated, and the seal is formed between the rib 12, which may then have a knife-edge configuration, and the complementary face of the mould part 4. In any case, this abutment provides a primary limit to the axial approach of the parts 4 and 5, thereby providing a primary limit to the width of the mould cavity. Irrespective of this abutment, the essential limit will be provided at the periphery of the cavity 8 between the mould parts 4 and 5 because the mould part 4 is urged by a force F, e.g. of a spring, towards the part 5. The flange 15 then operates to a small extent as a diaphragm, flexing about the point of abutment with the rib 12. The deflection of the mould part 4 is shown, exagerated, by the dotted lines 17 in Figure 2. However, the cooperation

between the rib 12 and the mould part 4 will effectively inhibit any significant loss of volatile constituent from the polymerisable liquid within the reservoir 11.

CLAIMS

1. A pair of cast plastics mould parts, for use in the moulding of opthalmic contact lenses, comprising a first part with a convex moulding surface and a second part with a concave moulding surface, the mould parts being arranged to be juxtaposed so that the two moulding surfaces define therebetween a moulding cavity for moulding a plastics contact lens, and, surrounding the moulding cavity, an annular reservoir from which, during shrinkage of a polymerisable liquid in the moulding cavity, a further amount of the liquid can be drawn from the reservoir into the cavity, the reservoir being substantially sealed by an annular seal which, in use, inhibits escape of any volatile constituent from the polymerisable liquid in the reservoir.

2. Mould parts according to claim 1, in which each of the mould parts has a radially outwardly extending annular flange at the end of the reservoir remote from the moulding cavity, the annular seal being provided by a rib formed intergrally with one of the flanges abutting an integral part of the other flange.

3. Mould parts according to claim 2, wherein the integral part of the other flange is a second rib, the two ribs having complementary abutting surfaces which are inclined to the mould axis.

4 Mould parts according to claim 2 or claim 3, in which, in use, the mould parts are arranged to be urged together, one of the flanges being flexible to allow the convex and concave moulding surfaces to abut one another to define the periphery of the moulding cavity after the annular seal abutment has occurred.

5. A pair of cast plastics mould parts, substantially as described with reference to the accompanying drawings.

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